

ABSTRACT

A method of preparing a poly-crystalline silicon (p-Si) film is provided with efficient dehydrogenation treatment of an amorphous silicon (a-Si) film deposited by a plasma enhanced chemical deposition (PECVD) process. A substrate is received in a process chamber of a PECVD system. A plasma discharge takes place to deposit an a-Si film on the substrate in an atmosphere in which reactive and carrier gases are supplied to the chamber. The substrate is still left in the chamber to carry out dehydrogenation of the a-Si film after the same is deposited on the substrate. While the carrier gas is supplied to the chamber during the leaving period of time, the pressure of the chamber is set higher than during the leaving period of time. The pressure of the chamber is set higher than during the deposition the pressure of the chamber is set higher. After the dehydrogenation treatment, the substrate is taken out from the chamber. XeCl₃ excimer laser beams are then used to irradiate the a-Si film to change it into a p-Si film.